

**Hall, Jennifer**

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**From:** Hall, Jennifer  
**Sent:** Monday, October 2, 2023 2:38 PM  
**To:** eComment  
**Subject:** FW: Comment re: Cabrillo Town Center Project - Agenda Item No. 18  
**Attachments:** 2023.10.02 FINAL CC Comment Letter w Ex.pdf

**From:** Marjan Kris Abubo [REDACTED]  
**Sent:** Monday, October 2, 2023 2:37 PM  
**To:** Comment@santa-ana.org; Hall, Jennifer <jhall@santa-ana.org>; Gomez, Pedro <PGomez@santa-ana.org>  
**Cc:** [REDACTED]  
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**Subject:** Comment re: Cabrillo Town Center Project - Agenda Item No. 18

Good afternoon Ms. Hall, Mr. Gomez, Mayor Amezcua, and Honorable Council Members,

On behalf of Supporters Alliance for Environmental Responsibility ("SAFER"), attached please find comments on the proposed mixed-use Cabrillo Town Center Project in the City of Santa Ana. This item is scheduled to be heard at the October 3, 2023 City Council hearing as Agenda Item 18. Please let me know if you have any questions or concerns and please confirm receipt of this email at your earliest convenience.

Thank you,

Marjan R. Abubo  
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October 2, 2023

***Via Email***

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**Re: SAFER Appeal on Cabrillo Town Center Project (CPC-2021-10345-DB-SPP-SPR-HCA), October 3, 2023 City Council Meeting – Agenda Item No. 18**

Dear Mayor Amezcua and Honorable City Council Members:

I am writing on behalf of Supporters Alliance for Environmental Responsibility (“SAFER”) in support of their appeal regarding the Cabrillo Town Center Project (Site Plan Review No. 2023-01, Tentative Tract Map No. 2023-03) which proposes the development of a five-story mixed-use building at 1901 and 1971 East Fourth Street and 515 and 525 North Cabrillo Park Drive in Santa Ana (“Project”).

The City has not conducted any environmental review for this Project pursuant to the California Environmental Quality Act (“CEQA”). Rather, the City is claiming that the Project was adequately reviewed in the Metro East Mixed Use Overlay Zone Environmental Impact Report (SCH No. 2006031041), certified in 2007, and a Subsequent Environmental Impact Report, certified in 2018 (collectively, “MEMU EIR”).

As discussed below, based on new information available since the 2018 SEIR was certified, the Project will have new significant impacts on air quality that were not analyzed in the MEMU EIR, and there are mitigation measures available to reduce those impacts. SAFER therefore respectfully requests that the City Council grant SAFER’s appeal and ensure that the Project complies with CEQA prior to approval.

## PROJECT DESCRIPTION

The Project proposes to demolish four commercial office buildings and construct a five-story mixed-use building that includes 449 residential units, a 898-stall parking garage, 6,000 square feet of retail space, and 9,000 square feet of live/work area. The Project also includes the development of a 58-unit townhome community with six three-story buildings and an additional 127 parking spaces.

## LEGAL STANDARD

The 2007 EIR and 2018 SEIR serve as a program EIR for the Metro East Mixed Use Overlay Zone. For program EIRs, “later activities in the program must be examined in the light of the program EIR to determine whether an additional environmental document must be prepared.” (14 CCR § 15168(c).) A program EIR may only serve “to the extent that it contemplates and adequately analyzes the potential environmental impacts of the project.” (*Sierra Nevada Conservation v. County of El Dorado* (2012) 202 Cal.App.4th 1156, 1171 [quoting *Citizens for Responsible Equitable Envtl. Dev. v. City of San Diego Redevelopment Agency* (2005) 134 Cal.App.4th 598, 615].) No new environmental document for a project is required if the project is “within the scope” of the program EIR. (14 CCR § 15168(c)(2).) Whether a project is “within the scope” of the program EIR is determined by whether a subsequent EIR is required under Guidelines section 15162. (*Id.*)

Pursuant to Guidelines sections 15162(a) and 15168(c), a project is not within the scope of a previous program EIR where:

- (1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
- (2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
- (3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:
  - (A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
  - (B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;
  - (C) Mitigation measures or alternatives previously found not to be feasible would, in fact, be feasible and would substantially reduce one or more

- significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
- (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

(14 CCR § 15162.)

If a later project is outside the scope of the program, then it is treated as a separate project and the lead agency must prepare an initial study to determine “whether the later project may cause significant effects on the environment that were not examined in the prior environmental impact report.” (PRC § 21094(c); see *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1320-21.) If there is a fair argument that the Project may result in new significant impacts, the agency must prepare an EIR, which can “tier” off the program EIR. (PRC § 21094; 14 CCR § 15168(c)(1).) The tiered EIR may “incorporate by reference the discussion in any prior [EIR] and [] concentrate on the environmental effects which (a) are capable of being mitigated, or (b) were not analyzed as significant effects on the environment in the prior [EIR]” (PRC § 21068.5.)

## DISCUSSION

### **I. An EIR is required because of new information regarding significant indoor air quality impacts and new available mitigation measures since certification of the MEMU EIR.**

The City can only exempt the Project from further CEQA review if the Project is “within the scope” of the MEMU EIR, as determined by the criteria of Guidelines section 15162. (14 CCR § 15168(c)(2).) Pursuant to Guidelines section 15162, the Project is not within the scope of the MEMU EIR where new information since the certification of the 2018 SEIR demonstrates that “[t]he project will have one or more significant effects not discussed in the previous EIR or negative declaration,” (14 CCR § 15162(a)(3)(A)) or that mitigation measures “which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure” (14 CCR § 15162(a)(3)(D)). Alternatively, a subsequent EIR is required under Guidelines Section 15162 when the same standards are met. Under those standards, an EIR or subsequent EIR is required because the indoor air quality impacts from formaldehyde could not have been known when the 2007 or 2018 EIRs were certified and because of new mitigation measures available to mitigate the Project’s indoor air quality impacts.

### **A. The Project’s significant impacts to human health from indoor emissions of formaldehyde as well as the mitigation measures available to reduce that impact are new information that could not have been known prior to 2019.**

Certified Industrial Hygienist, Francis Offermann, PE, CIH, has conducted a review of



the Project. Mr. Offermann is one of the world's leading experts on indoor air quality, in particular emissions of formaldehyde, and has published extensively on the topic. As discussed below and set forth in Mr. Offermann's comment, the Project's emissions of formaldehyde to air will result in very significant cancer risks to future residents and employees of the Project. Mr. Offermann's comment and CV are attached as Exhibit A.

Formaldehyde is a known human carcinogen and listed by the State of California as a Toxic Air Contaminant ("TAC"). The South Coast Air Quality Management District ("SCAQMD") has established a significance threshold of health risks for carcinogenic TACs of 10 in a million. (Ex. A, p. 2.) Mr. Offermann explains that many composite wood products typically used in home and apartment building construction contain formaldehyde-based glues which off-gas formaldehyde over a very long time period. He states, "The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particle board. These materials are commonly used in residential, office, and retail building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims." (*Id.*, p. 3.)

Mr. Offermann concludes that future residents of the Project will be exposed to a cancer risk from formaldehyde of approximately 120 per million, *even assuming* that all materials are compliant with the California Air Resources Board's ("CARB") formaldehyde airborne toxics control measure. (Ex. A, p. 4.) This exceeds SCAQMD's CEQA significance threshold for airborne cancer risk of 10 per million. Importantly, Mr. Offermann's conclusions are based on studies conducted in 2019 and therefore were not available when the 2007 EIR or 2018 SEIR were approved.

Mr. Offermann concludes that these significant environmental impacts must be analyzed and mitigation measures should be imposed to reduce the risk of formaldehyde exposure. (Ex. A, pp. 5-7, 13-14.) He prescribes a methodology for estimating the Project's formaldehyde emissions to do a more project-specific health risk assessment. (*Id.*, pp. 7-9.). Importantly, the previous 2007 EIR and 2018 SEIR did not address indoor air quality impacts or formaldehyde emissions. Because these impacts were not previously analyzed at all, the fair argument standard applies and an EIR is required to address and mitigate this impact.

When a Project exceeds a duly adopted CEQA significance threshold, as here, this alone establishes substantial evidence that the project will have a significant adverse environmental impact. Indeed, in many instances, such air quality thresholds are the only criteria reviewed and treated as dispositive in evaluating the significance of a project's air quality impacts. (See, e.g. *Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 960 [County applies Air District's "published CEQA quantitative criteria" and "threshold level of cumulative significance"]; see also *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 110-111 ["A 'threshold of significance' for a given environmental effect is simply that level at which the lead agency finds the effects of the project to be significant"].)

The California Supreme Court made clear the substantial importance that an air district

significance threshold plays in providing substantial evidence of a significant adverse impact. (*Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 327 [“As the [South Coast Air Quality Management] District’s established significance threshold for NO<sub>x</sub> is 55 pounds per day, these estimates [of NO<sub>x</sub> emissions of 201 to 456 pounds per day] constitute substantial evidence supporting a fair argument for a significant adverse impact.”].) Since expert evidence demonstrates that the Project will exceed the SCAQMD’s CEQA significance threshold, there is substantial evidence that an “unstudied, potentially significant environmental effect[]” exists. (See *San Mateo Gardens, supra*, 1 Cal.5th at 958.)

The failure to address the Project’s formaldehyde emissions is contrary to the California Supreme Court’s decision in *California Building Industry Ass’n v. Bay Area Air Quality Mgmt. Dist.* (2015) 62 Cal.4th 369, 386 (“CBIA”). In that case, the Supreme Court expressly holds that potential adverse impacts to future users and residents from pollution generated by a proposed project must be addressed under CEQA. At issue in *CBIA* was whether the Air District could enact CEQA guidelines that advised lead agencies that they must analyze the impacts of adjacent environmental conditions on a project. The Supreme Court held that CEQA does not generally require lead agencies to consider the environment’s effects on a project. (*CBIA*, 62 Cal.4th at 800-01.) However, to the extent a project may exacerbate existing environmental conditions at or near a project site, those would still have to be considered pursuant to CEQA. (*Id.* at 801.) In so holding, the Court expressly held that CEQA’s statutory language required lead agencies to disclose and analyze “impacts on a project’s users or residents that arise from the project’s effects on the environment.” (*Id.* at 800.)

The carcinogenic formaldehyde emissions identified by Mr. Offermann are not an existing environmental condition. Those emissions to the air will be from the Project. Once built, the Project will begin to emit formaldehyde at levels that pose significant direct and cumulative health risks to residents of the Project. The Supreme Court in *CBIA* expressly finds that this type of air emission and health impact by the project on the environment and a “project’s users and residents” must be addressed in the CEQA process. The existing TAC sources near the Project site would have to be considered in evaluating the cumulative effect on future residents of both the Project’s TAC emissions as well as those existing off-site emissions.

The Supreme Court’s reasoning is well-grounded in CEQA’s statutory language. CEQA expressly includes a project’s effects on human beings as an effect on the environment that must be addressed in an environmental review. “Section 21083(b)(3)’s express language, for example, requires a finding of a ‘significant effect on the environment’ (§ 21083(b)) whenever the ‘environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.’” (*CBIA*, 62 Cal.4th at 800.) Likewise, “the Legislature has made clear—in declarations accompanying CEQA’s enactment—that public health and safety are of great importance in the statutory scheme.” (*Id.* [citing e.g., §§ 21000, subds. (b), (c), (d), (g), 21001, subds. (b), (d)].) It goes without saying that the future residents and employees of the Project are human beings and the health and safety of those residents must be subjected to CEQA’s safeguards.

The City has a duty to investigate issues relating to a project's potential environmental impacts. (See *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1597–98. [“[U]nder CEQA, the lead agency bears a burden to investigate potential environmental impacts.”].) The proposed Project will have significant impacts on air quality and health risks by emitting cancer-causing levels of formaldehyde into the air that will expose future employees to cancer risks potentially in excess of SCAQMD's threshold of significance for cancer health risks of 10 in a million.

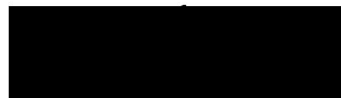
As discussed above, the Project will result in a significant impact to human health from indoor emissions of formaldehyde. This potential indoor air quality impact could not have been known until 2019 when the first study was published showing that homes using composite wood products that comply with CARB standards vastly exceed CEQA significance thresholds for cancer risk. Therefore, this impact was not known and could not have been known when the 2007 EIR was certified or in 2018 when the SEIR was certified. When scientific information was not available at the time of prior CEQA review, more recent studies showing that a project may have more serious human health or environmental impacts constitute significant new information requiring a subsequent EIR. (*Security Envt'l Sys. v South Coast Air Quality Mgmt. Dist.* (1991) 229 Cal.App.3d 110, 124; *Meridian Ocean Sys. v. State Lands Com.* (1990) 222 Cal.App.3d 153, 169) As such, under CEQA Guidelines sections 15162, 15168, and 15164 and an EIR is required. (See 14 CCR §§ 15162(a)(3), 15164(a), 15168.)

Additionally, Mr. Offermann suggests mitigating the Project's indoor air quality impacts by requiring all composite wood products used in construction of the Project to be manufactured with CARB-approved no-added formaldehyde (NAF) resins. (Ex. A, pp. 13-14.) Because indoor air quality impacts were not analyzed in the 2007 EIR or 2018 SEIR, the City has not considered NAF composite wood products. Furthermore, such NAF products have only become readily available recently and, thus, could not have been considered in 2007 and 2018. Because the 2007 EIR and 2018 SEIR do not adopt any measures to reduce indoor formaldehyde emissions, an EIR is required.

## CONCLUSION

Accordingly, SAFER respectfully requests that the City Council grant the appeal and direct staff to prepare an EIR for the Project in accordance with CEQA. Thank you for considering these comments.

Sincerely,



Marjan Abubo  
Lozeau | Drury LLP

# EXHIBIT A



## INDOOR ENVIRONMENTAL ENGINEERING



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Date: September 23, 2023

To: Marjan Kris Abubo  
Lozeau | Drury LLP

[REDACTED]  
Oakland, California 94612

From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: Cabrillo Town Center Project, Santa Ana, CA  
IEE File Reference: P-4753)

Pages: 19

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### **Indoor Air Quality Impacts**

Indoor air quality (IAQ) directly impacts the comfort and health of building occupants, and the achievement of acceptable IAQ in newly constructed and renovated buildings is a well-recognized design objective. For example, IAQ is addressed by major high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014). Indoor air quality in homes is particularly important because occupants, on average, spend approximately ninety percent of their time indoors with the majority of this time spent at home (EPA, 2011). Some segments of the population that are most susceptible to the effects of poor IAQ, such as the very young and the elderly, occupy their homes almost continuously. Additionally, an increasing number of adults are working from home at least some of the time during the workweek. Indoor air quality also is a serious concern for workers in hotels, offices and other business establishments.

The concentrations of many air pollutants often are elevated in homes and other buildings

relative to outdoor air because many of the materials and products used indoors contain and release a variety of pollutants to air (Hodgson et al., 2002; Offermann and Hodgson, 2011). With respect to indoor air contaminants for which inhalation is the primary route of exposure, the critical design and construction parameters are the provision of adequate ventilation and the reduction of indoor sources of the contaminants.

**Indoor Formaldehyde Concentrations Impact.** In the California New Home Study (CNHS) of 108 new homes in California (Offermann, 2009), 25 air contaminants were measured, and formaldehyde was identified as the indoor air contaminant with the highest cancer risk as determined by the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), No Significant Risk Levels (NSRL) for carcinogens. The NSRL is the daily intake level calculated to result in one excess case of cancer in an exposed population of 100,000 (i.e., ten in one million cancer risk) and for formaldehyde is 40 µg/day. The NSRL concentration of formaldehyde that represents a daily dose of 40 µg is 2 µg/m<sup>3</sup>, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m<sup>3</sup>, and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 µg/m<sup>3</sup>. The median indoor formaldehyde concentration was 36 µg/m<sup>3</sup>, and ranged from 4.8 to 136 µg/m<sup>3</sup>, which corresponds to a median exceedance of the 2 µg/m<sup>3</sup> NSRL concentration of 18 and a range of 2.3 to 68.

Therefore, the cancer risk of a resident living in a California home with the median indoor formaldehyde concentration of 36 µg/m<sup>3</sup>, is 180 per million as a result of formaldehyde alone. The CEQA significance threshold for airborne cancer risk is 10 per million, as established by the South Coast Air Quality Management District (SCAQMD, 2015).

Besides being a human carcinogen, formaldehyde is also a potent eye and respiratory irritant. In the CNHS, many homes exceeded the non-cancer reference exposure levels (RELs) prescribed by California Office of Environmental Health Hazard Assessment (OEHHA, 2017b). The percentage of homes exceeding the RELs ranged from 98% for the Chronic REL of 9 µg/m<sup>3</sup> to 28% for the Acute REL of 55 µg/m<sup>3</sup>.



The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.

In January 2009, the California Air Resources Board (CARB) adopted an airborne toxics control measure (ATCM) to reduce formaldehyde emissions from composite wood products, including hardwood plywood, particleboard, medium density fiberboard, and also furniture and other finished products made with these wood products (California Air Resources Board 2009). While this formaldehyde ATCM has resulted in reduced emissions from composite wood products sold in California, they do not preclude that homes built with composite wood products meeting the CARB ATCM will have indoor formaldehyde concentrations below cancer and non-cancer exposure guidelines.

A follow up study to the California New Home Study (CNHS) was conducted in 2016-2018 (Singer et. al., 2019), and found that the median indoor formaldehyde in new homes built after 2009 with CARB Phase 2 Formaldehyde ATCM materials had lower indoor formaldehyde concentrations, with a median indoor concentrations of  $22.4 \mu\text{g}/\text{m}^3$  (18.2 ppb) as compared to a median of  $36 \mu\text{g}/\text{m}^3$  found in the 2007 CNHS. Unlike in the CNHS study where formaldehyde concentrations were measured with pumped DNPH samplers, the formaldehyde concentrations in the HENGH study were measured with passive samplers, which were estimated to under-measure the true indoor formaldehyde concentrations by approximately 7.5%. Applying this correction to the HENGH indoor formaldehyde concentrations results in a median indoor concentration of  $24.1 \mu\text{g}/\text{m}^3$ , which is 33% lower than the  $36 \mu\text{g}/\text{m}^3$  found in the 2007 CNHS.

Thus, while new homes built after the 2009 CARB formaldehyde ATCM have a 33% lower median indoor formaldehyde concentration and cancer risk, the median lifetime cancer risk is still 120 per million for homes built with CARB compliant composite wood products. This median lifetime cancer risk is more than 12 times the OEHHA 10 in a million cancer risk threshold (OEHHA, 2017a).

With respect to the Cabrillo Town Center Project, Santa Ana, CA, the buildings consist of residential and commercial spaces.

The residential occupants will potentially have continuous exposure (e.g., 24 hours per day, 52 weeks per year). These exposures are anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residential construction.

Because these residences will be constructed with CARB Phase 2 Formaldehyde ATCM materials and be ventilated with the minimum code required amount of outdoor air, the indoor residential formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of  $24.1 \mu\text{g}/\text{m}^3$  (Singer et. al., 2020).

Assuming that the residential occupants inhale  $20 \text{ m}^3$  of air per day, the average 70-year lifetime formaldehyde daily dose is  $482 \mu\text{g}/\text{day}$  for continuous exposure in the residences. This exposure represents a cancer risk of 120 per million, which is more than 12 times the CEQA cancer risk of 10 per million. For occupants that do not have continuous exposure, the cancer risk will be proportionally less but still substantially over the CEQA cancer risk of 10 per million (e.g., for 12/hour/day occupancy, more than 6 times the CEQA cancer risk of 10 per million).

The employees of the commercial spaces are expected to experience significant indoor exposures (e.g., 40 hours per week, 50 weeks per year). These exposures for employees are anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in offices, warehouses, residences and hotels.

Because the commercial spaces will be constructed with CARB Phase 2 Formaldehyde ATCM materials, and be ventilated with the minimum code required amount of outdoor air, the indoor formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which

is a median of 24.1  $\mu\text{g}/\text{m}^3$  (Singer et. al., 2020)

Assuming that the commercial space employees work 8 hours per day and inhale 20  $\text{m}^3$  of air per day, the formaldehyde dose per work-day is 161  $\mu\text{g}/\text{day}$ .

Assuming that these employees work 5 days per week and 50 weeks per year for 45 years (start at age 20 and retire at age 65) the average 70-year lifetime formaldehyde daily dose is 70.9  $\mu\text{g}/\text{day}$ .

This is 1.77 times the NSRL (OEHHA, 2017a) of 40  $\mu\text{g}/\text{day}$  and represents a cancer risk of 17.7 per million, which exceeds the CEQA cancer risk of 10 per million. This impact should be analyzed in an environmental impact report (“EIR”), and the agency should impose all feasible mitigation measures to reduce this impact. Several feasible mitigation measures are discussed below and these and other measures should be analyzed in an EIR.

In addition, we note that the average outdoor air concentration of formaldehyde in California is 3 ppb, or 3.7  $\mu\text{g}/\text{m}^3$ , (California Air Resources Board, 2004), and thus represents an average pre-existing background airborne cancer risk of 1.85 per million. Thus, the indoor air formaldehyde exposures describe above exacerbate this pre-existing risk resulting from outdoor air formaldehyde exposures.

Additionally, the SCAQMD’s Multiple Air Toxics Exposure Study (“MATES V”) identifies an existing cancer risk at the Project site of 416 per million due to the site’s elevated ambient air contaminant concentrations, which are due to the area’s high levels of vehicle traffic. These impacts would further exacerbate the pre-existing cancer risk to the building occupants, which result from exposure to formaldehyde in both indoor and outdoor air.

Appendix A, Indoor Formaldehyde Concentrations and the CARB Formaldehyde ATCM, provides analyses that show utilization of CARB Phase 2 Formaldehyde ATCM materials will not ensure acceptable cancer risks with respect to formaldehyde emissions from composite wood products.

Even composite wood products manufactured with CARB certified ultra-low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

The following describes a method that should be used, prior to construction in the environmental review under CEQA, for determining whether the indoor concentrations resulting from the formaldehyde emissions of specific building materials/furnishings selected exceed cancer and non-cancer guidelines. Such a design analyses can be used to identify those materials/furnishings prior to the completion of the City's CEQA review and project approval, that have formaldehyde emission rates that contribute to indoor concentrations that exceed cancer and non-cancer guidelines, so that alternative lower emitting materials/furnishings may be selected and/or higher minimum outdoor air ventilation rates can be increased to achieve acceptable indoor concentrations and incorporated as mitigation measures for this project.

#### Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment

This formaldehyde emissions assessment should be used in the environmental review under CEQA to assess the indoor formaldehyde concentrations from the proposed loading of building materials/furnishings, the area-specific formaldehyde emission rate data for building materials/furnishings, and the design minimum outdoor air ventilation rates. This assessment allows the applicant (and the City) to determine, before the conclusion of the environmental review process and the building materials/furnishings are specified, purchased, and installed, if the total chemical emissions will exceed cancer and non-cancer guidelines, and if so, allow for changes in the selection of specific material/furnishings and/or the design minimum outdoor air ventilations rates such that cancer and non-cancer guidelines are not exceeded.

1.) Define Indoor Air Quality Zones. Divide the building into separate indoor air quality zones, (IAQ Zones). IAQ Zones are defined as areas of well-mixed air. Thus, each ventilation system with recirculating air is considered a single zone, and each room or group of rooms where air is not recirculated (e.g. 100% outdoor air) is considered a separate zone. For IAQ Zones with the same construction material/furnishings and design minimum outdoor air ventilation rates. (e.g. hotel rooms, apartments, condominiums, etc.) the formaldehyde emission rates need only be assessed for a single IAQ Zone of that type.

2.) Calculate Material/Furnishing Loading. For each IAQ Zone, determine the building material and furnishing loadings (e.g., m<sup>2</sup> of material/m<sup>2</sup> floor area, units of furnishings/m<sup>2</sup> floor area) from an inventory of all potential indoor formaldehyde sources, including flooring, ceiling tiles, furnishings, finishes, insulation, sealants, adhesives, and any products constructed with composite wood products containing urea-formaldehyde resins (e.g., plywood, medium density fiberboard, particleboard).

3.) Calculate the Formaldehyde Emission Rate. For each building material, calculate the formaldehyde emission rate (µg/h) from the product of the area-specific formaldehyde emission rate (µg/m<sup>2</sup>-h) and the area (m<sup>2</sup>) of material in the IAQ Zone, and from each furnishing (e.g. chairs, desks, etc.) from the unit-specific formaldehyde emission rate (µg/unit-h) and the number of units in the IAQ Zone.

NOTE: As a result of the high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014), most manufacturers of building materials furnishings sold in the United States conduct chemical emission rate tests using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), or other equivalent chemical emission rate testing methods. Most manufacturers of building furnishings sold in the United States conduct chemical emission rate tests using ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions (BIFMA, 2018), or other equivalent chemical emission rate testing methods.



CDPH, BIFMA, and other chemical emission rate testing programs, typically certify that a material or furnishing does not create indoor chemical concentrations in excess of the maximum concentrations permitted by their certification. For instance, the CDPH emission rate testing requires that the measured emission rates when input into an office, school, or residential model do not exceed one-half of the OEHHA Chronic Exposure Guidelines (OEHHA, 2017b) for the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017). These certifications themselves do not provide the actual area-specific formaldehyde emission rate (i.e.,  $\mu\text{g}/\text{m}^2\text{-h}$ ) of the product, but rather provide data that the formaldehyde emission rates do not exceed the maximum rate allowed for the certification. Thus, for example, the data for a certification of a specific type of flooring may be used to calculate that the area-specific emission rate of formaldehyde is less than  $31 \mu\text{g}/\text{m}^2\text{-h}$ , but not the actual measured specific emission rate, which may be 3, 18, or  $30 \mu\text{g}/\text{m}^2\text{-h}$ . These area-specific emission rates determined from the product certifications of CDPH, BIFA, and other certification programs can be used as an initial estimate of the formaldehyde emission rate.

If the actual area-specific emission rates of a building material or furnishing is needed (i.e. the initial emission rates estimates from the product certifications are higher than desired), then that data can be acquired by requesting from the manufacturer the complete chemical emission rate test report. For instance if the complete CDPH emission test report is requested for a CDHP certified product, that report will provide the actual area-specific emission rates for not only the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017), but also all of the cancer and reproductive/developmental chemicals listed in the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), all of the toxic air contaminants (TACs) in the California Air Resources Board Toxic Air Contamination List (CARB, 2011), and the 10 chemicals with the greatest emission rates.

Alternatively, a sample of the building material or furnishing can be submitted to a chemical emission rate testing laboratory, such as Berkeley Analytical Laboratory (<https://berkeleyanalytical.com>), to measure the formaldehyde emission rate.



4.) Calculate the Total Formaldehyde Emission Rate. For each IAQ Zone, calculate the total formaldehyde emission rate (i.e. µg/h) from the individual formaldehyde emission rates from each of the building material/furnishings as determined in Step 3.

5.) Calculate the Indoor Formaldehyde Concentration. For each IAQ Zone, calculate the indoor formaldehyde concentration (µg/m<sup>3</sup>) from Equation 1 by dividing the total formaldehyde emission rates (i.e. µg/h) as determined in Step 4, by the design minimum outdoor air ventilation rate (m<sup>3</sup>/h) for the IAQ Zone.

$$C_{in} = \frac{E_{total}}{Q_{oa}} \text{ (Equation 1)}$$

where:

$C_{in}$  = indoor formaldehyde concentration (µg/m<sup>3</sup>)

$E_{total}$  = total formaldehyde emission rate (µg/h) into the IAQ Zone.

$Q_{oa}$  = design minimum outdoor air ventilation rate to the IAQ Zone (m<sup>3</sup>/h)

The above Equation 1 is based upon mass balance theory, and is referenced in Section 3.10.2 “Calculation of Estimated Building Concentrations” of the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017).

6.) Calculate the Indoor Exposure Cancer and Non-Cancer Health Risks. For each IAQ Zone, calculate the cancer and non-cancer health risks from the indoor formaldehyde concentrations determined in Step 5 and as described in the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015).

7.) Mitigate Indoor Formaldehyde Exposures of exceeding the CEQA Cancer and/or Non-Cancer Health Risks. In each IAQ Zone, provide mitigation for any formaldehyde exposure risk as determined in Step 6, that exceeds the CEQA cancer risk of 10 per million or the CEQA non-cancer Hazard Quotient of 1.0.

Provide the source and/or ventilation mitigation required in all IAQ Zones to reduce the

health risks of the chemical exposures below the CEQA cancer and non-cancer health risks.

Source mitigation for formaldehyde may include:

- 1.) reducing the amount materials and/or furnishings that emit formaldehyde
- 2.) substituting a different material with a lower area-specific emission rate of formaldehyde

Ventilation mitigation for formaldehyde emitted from building materials and/or furnishings may include:

- 1.) increasing the design minimum outdoor air ventilation rate to the IAQ Zone.

NOTE: Mitigating the formaldehyde emissions through use of less material/furnishings, or use of lower emitting materials/furnishings, is the preferred mitigation option, as mitigation with increased outdoor air ventilation increases initial and operating costs associated with the heating/cooling systems.

Further, we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), and use the procedure described earlier above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

**Outdoor Air Ventilation Impact.** Another important finding of the CNHS, was that the outdoor air ventilation rates in the homes were very low. Outdoor air ventilation is a very important factor influencing the indoor concentrations of air contaminants, as it is the primary removal mechanism of all indoor air generated contaminants. Lower outdoor air exchange rates cause indoor generated air contaminants to accumulate to higher indoor air concentrations. Many homeowners rarely open their windows or doors for ventilation as a

result of their concerns for security/safety, noise, dust, and odor concerns (Price, 2007). In the CNHS field study, 32% of the homes did not use their windows during the 24-hour Test Day, and 15% of the homes did not use their windows during the entire preceding week. Most of the homes with no window usage were homes in the winter field session. Thus, a substantial percentage of homeowners never open their windows, especially in the winter season. The median 24-hour measurement was 0.26 air changes per hour (ach), with a range of 0.09 ach to 5.3 ach. A total of 67% of the homes had outdoor air exchange rates below the minimum California Building Code (2001) requirement of 0.35 ach. Thus, the relatively tight envelope construction, combined with the fact that many people never open their windows for ventilation, results in homes with low outdoor air exchange rates and higher indoor air contaminant concentrations.

According to the Draft Subsequent Environmental Impact Report Metro East Mixed-Use Overlay District Expansion and Elan Development Project (ICF, 2018), the Project is close to roads with moderate to high traffic (e.g., I-5, East 4<sup>th</sup> Street, North Cabrillo Park Avenue, etc.).

This report state in Table T3.7.1, the existing 2018 ambient noise levels range from 63.7 to 73.0 dBA CNEL. Thus this Project is located in a sound impacted area.

In order to design the buildings for this Project such that interior noise levels are acceptable, an acoustic study with actual on-site measurements of the existing ambient noise levels and modeled future ambient noise levels needs to be conducted. The acoustic study of the existing ambient noise levels should be conducted over a one-week period. and report the dBA CNEL or Ldn. This study will allow for the selection of a building envelope and windows with a sufficient STC such that the indoor noise levels are acceptable. A mechanical supply of outdoor air ventilation to allow for a habitable interior environment with closed windows and doors will also be requires. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within building interiors.

As a result of the anticipated high outdoor noise levels, the Project will likely require a mechanical supply of outdoor air ventilation to allow for a habitable interior environment with closed windows and doors. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within building interiors.

**PM<sub>2.5</sub> Outdoor Concentrations Impact.** An additional impact of the nearby motor vehicle traffic associated with this project, are the outdoor concentrations of PM<sub>2.5</sub>. According to the Draft Subsequent Environmental Impact Report Metro East Mixed-Use Overlay District Expansion and Elan Development Project (ICF, 2018), the Project is located in the South Coast Air Basin, which is a State and Federal non-attainment area for PM<sub>2.5</sub>.

Additionally, the SCAQMD's MATES V study cites an existing cancer risk of 416 per million at the Project site due to the site's high concentration of ambient air contaminants resulting from the area's high levels of motor vehicle traffic.

An air quality analyses should be conducted to determine the concentrations of PM<sub>2.5</sub> in the outdoor and indoor air that people inhale each day. This air quality analyses needs to consider the cumulative impacts of the project related emissions, existing and projected future emissions from local PM<sub>2.5</sub> sources (e.g. stationary sources, motor vehicles, and airport traffic) upon the outdoor air concentrations at the Project site. If the outdoor concentrations are determined to exceed the California and National annual average PM<sub>2.5</sub> exceedence concentration of 12 µg/m<sup>3</sup>, or the National 24-hour average exceedence concentration of 35 µg/m<sup>3</sup>, then the buildings need to have a mechanical supply of outdoor air that has air filtration with sufficient removal efficiency, such that the indoor concentrations of outdoor PM<sub>2.5</sub> particles is less than the California and National PM<sub>2.5</sub> annual and 24-hour standards.

It is my experience that based on the projected high traffic noise levels, the annual average concentration of PM<sub>2.5</sub> will exceed the California and National PM<sub>2.5</sub> annual and 24-hour standards and warrant installation of high efficiency air filters (i.e. MERV 13 or higher) in all mechanically supplied outdoor air ventilation systems.

## **Indoor Air Quality Impact Mitigation Measures**

The following are recommended mitigation measures to minimize the impacts upon indoor quality:

Indoor Formaldehyde Concentrations Mitigation. Use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins (CARB, 2009). CARB Phase 2 certified composite wood products, or ultra-low emitting formaldehyde (ULEF) resins, do not insure indoor formaldehyde concentrations that are below the CEQA cancer risk of 10 per million. Only composite wood products manufactured with CARB approved no-added formaldehyde (NAF) resins, such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHHA cancer risk of 10 per million is met.

Alternatively, conduct the previously described Pre-Construction Building Material/Furnishing Chemical Emissions Assessment, to determine that the combination of formaldehyde emissions from building materials and furnishings do not create indoor formaldehyde concentrations that exceed the CEQA cancer and non-cancer health risks.

It is important to note that we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017), and use the procedure described above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Mitigation. Provide each habitable room with a continuous mechanical supply of outdoor air that meets or exceeds the California 2016 Building Energy Efficiency Standards (California Energy Commission, 2015) requirements of the greater of 15 cfm/occupant or 0.15 cfm/ft<sup>2</sup> of floor area. Following installation of the system conduct testing and balancing to insure that required amount of outdoor air is entering each habitable room and provide a written report documenting the outdoor airflow rates. Do not use exhaust only mechanical outdoor air systems, use only balanced outdoor air supply and exhaust systems or outdoor air supply only systems. Provide a manual for the occupants or maintenance personnel, that describes the purpose of the mechanical outdoor air system and the operation and maintenance requirements of the system.

PM<sub>2.5</sub> Outdoor Air Concentration Mitigation. Install air filtration with sufficient PM<sub>2.5</sub> removal efficiency (e.g. MERV 13 or higher) to filter the outdoor air entering the mechanical outdoor air supply systems, such that the indoor concentrations of outdoor PM<sub>2.5</sub> particles are less than the California and National PM<sub>2.5</sub> annual and 24-hour standards. Install the air filters in the system such that they are accessible for replacement by the occupants or maintenance personnel. Include in the mechanical outdoor air ventilation system manual instructions on how to replace the air filters and the estimated frequency of replacement.

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## APPENDIX A

### INDOOR FORMALDEHYDE CONCENTRATIONS AND THE CARB FORMALDEHYDE ATCM

With respect to formaldehyde emissions from composite wood products, the CARB ATCM regulations of formaldehyde emissions from composite wood products, do not assure healthful indoor air quality. The following is the stated purpose of the CARB ATCM regulation - *The purpose of this airborne toxic control measure is to “reduce formaldehyde emissions from composite wood products, and finished goods that contain composite wood products, that are sold, offered for sale, supplied, used, or manufactured for sale in California”*. In other words, the CARB ATCM regulations do not “assure healthful indoor air quality”, but rather “reduce formaldehyde emissions from composite wood products”.

Just how much protection do the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products? Definitely some, but certainly the regulations do not “*assure healthful indoor air quality*” when CARB Phase 2 products are utilized. As shown in the Chan 2019 study of new California homes, the median indoor formaldehyde concentration was of 22.4  $\mu\text{g}/\text{m}^3$  (18.2 ppb), which corresponds to a cancer risk of 112 per million for occupants with continuous exposure, which is more than 11 times the CEQA cancer risk of 10 per million.

Another way of looking at how much protection the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products is to calculate the maximum number of square feet of composite wood product that can be in a residence without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy.

For this calculation I utilized the floor area (2,272  $\text{ft}^2$ ), the ceiling height (8.5 ft), and the number of bedrooms (4) as defined in Appendix B (New Single-Family Residence Scenario) of the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1, 2017, California

Department of Public Health, Richmond, CA. <https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx>.

For the outdoor air ventilation rate I used the 2019 Title 24 code required mechanical ventilation rate (ASHRAE 62.2) of 106 cfm (180 m<sup>3</sup>/h) calculated for this model residence. For the composite wood formaldehyde emission rate I used the CARB ATCM Phase 2 rates.

The calculated maximum number of square feet of composite wood product that can be in a residence, without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 15 ft<sup>2</sup> (0.7% of the floor area), or  
Particle Board – 30 ft<sup>2</sup> (1.3% of the floor area), or  
Hardwood Plywood – 54 ft<sup>2</sup> (2.4% of the floor area), or  
Thin MDF – 46 ft<sup>2</sup> (2.0 % of the floor area).

For offices and hotels the calculated maximum amount of composite wood product (% of floor area) that can be used without exceeding the CEQA cancer risk of 10 per million for occupants, assuming 8 hours/day occupancy, and the California Mechanical Code minimum outdoor air ventilation rates are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 3.6 % (offices) and 4.6% (hotel rooms), or  
Particle Board – 7.2 % (offices) and 9.4% (hotel rooms), or  
Hardwood Plywood – 13 % (offices) and 17% (hotel rooms), or  
Thin MDF – 11 % (offices) and 14 % (hotel rooms)

Clearly the CARB ATCM does not regulate the formaldehyde emissions from composite wood products such that the potentially large areas of these products, such as for flooring, baseboards, interior doors, window and door trims, and kitchen and bathroom cabinetry, could be used without causing indoor formaldehyde concentrations that result in CEQA



cancer risks that substantially exceed 10 per million for occupants with continuous occupancy.

Even composite wood products manufactured with CARB certified ultra low emitting formaldehyde (ULEF) resins do not insure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can insure that the OEHHA cancer risk of 10 per million is met.

If CARB Phase 2 compliant or ULEF composite wood products are utilized in construction, then the resulting indoor formaldehyde concentrations should be determined in the design phase using the specific amounts of each type of composite wood product, the specific formaldehyde emission rates, and the volume and outdoor air ventilation rates of the indoor spaces, and all feasible mitigation measures employed to reduce this impact (e.g. use less formaldehyde containing composite wood products and/or incorporate mechanical systems capable of higher outdoor air ventilation rates). See the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Alternatively, and perhaps a simpler approach, is to use only composite wood products (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins.